UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,152	03/01/2002	Rene P. Helbing	10004263-1	2625

7590 01/25/2006

AGILENT TECHNOLOGIES, INC.
P.O. Box 7599
Loveland, CO 80537-0599

EXAMINER	
TRAN, DZUNG D	

ART UNIT	PAPER NUMBER
2638	

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/087,152	HELBING ET AL.	
	Examiner	Art Unit	
	Dzung D Tran	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 7, 11-13, 19-21, 26-29, 31 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Inada et al. (hereinafter Inada) US Patent no. 6,920,261.

Regarding claim 1, Inada discloses in Figure 10, an apparatus for spectral dispersion compensation in an optical communication network, comprising:

at least one optical fiber 1 of figure 10 that carrying a light beam $\lambda 1$, $\lambda 2 \ldots \lambda n$ having different wavelengths, , see col. 8, lines 23-24, (equivalent to optical medium having a signal distributed over a plurality of wavelengths), a portion of the signal on each wavelength (e.g. since the light beam is a multiplexed signal having wavelengths $\lambda 1$, $\lambda 2 \ldots \lambda n$, see col. 3, line 12, thus a portion of the light beam on each wavelength $\lambda 1$ or $\lambda 2$, ... or λn);

a multiplexer/**demultiplexer** 3 of figure 10 having input waveguide (see Fig. 10) adapted to receive the plurality of wavelengths from the optical fiber (e.g., the optical

fiber from circulator 2 to AWG 3) and **divide** the plurality of wavelengths λ1, λ2... λn, into individual wavelength λ1, λ2... λn. Inada discloses in figure 10, the dispersion compensation 7 connected to the plurality of output waveguides 4 for dispersion compensation each wavelengths λ1, λ2... λn, the individual wavelengths relatively delayed by a respective dispersion compensation element 7, each dispersion compensation element 7 having a different delay characteristic, see Figure 10, so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength (col. 11, lines 57-67); and

a **multiplexer**/demultiplexer 3 of figure 10 adapted to receive each wavelength λ1, λ2... λn and **combine** the wavelengths onto the waveguide then output to optical medium (e.g., the optical fiber from AWG 3 to circulator 2).

Regarding claim 12, Inada discloses a multiplexer/**demultiplexer** 3 of figure 10 are a single element.

Regarding claims 13 and 20, Inada discloses an apparatus/method for spectral dispersion compensation in an optical network, comprising:

an optical fiber 1 of figure 10 that carrying a WDM signal for supplying a signal distributed over a plurality of wavelengths to a multiplexer/demultiplexer 3 of figure 10 (equivalent to a demultiplexer); a portion of the signal on each wavelength (e.g. since the light beam is a multiplexed signal having wavelengths λ1, λ2... λn, thus a portion of the light beam on each wavelength λ1 or λ2, ... or λn);

a multiplexer/**demultiplexer** 3 of figure 10 for **dividing** the plurality of wavelengths into individual wavelengths λ1 or λ2, ... or λn;

Inada discloses in figure 10, the dispersion compensation 7 connected to the plurality of output waveguides 4 for dispersion compensation each wavelengths λ1, λ2... λn, the individual wavelengths relatively delayed by a respective dispersion compensation element 7, each dispersion compensation element 7 having a different delay characteristic, see Figure 10, so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength (col. 11, lines 57-67); and

a **multiplexer**/demultiplexer 3 of figure 10 for **combining** each wavelength onto an optical medium.

Regarding claims 2, 21, 27 and 31, Inada discloses in figure 10,.the dispersion compensation 7 connected to the plurality of output waveguides 4 for dispersion compensation each wavelengths λ1, λ2... λn, the individual wavelengths relatively delayed by a respective dispersion compensation element 7, each dispersion compensation element 7 having a different delay characteristic, see Figure 10, so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength (col. 11, lines 57-67). Furthermore, the dispersion compensation of Inada is constructed as same as the claimed dispersion compensation, thus, it would be inherently that it is capable to reduce inter-wavelength spectral dispersion.

Regarding claim 7, Inada discloses multiplexer/demultiplexer 3 of figure 10 (equivalent to the multiplexer and the demultiplexer) are an array waveguide (AWG) (see Fig. 10).

Regarding claims 11, 19 and 26, Inada discloses in figure 10, the dispersion compensation 7 connected to the plurality of output waveguides 4 for dispersion compensation each wavelengths $\lambda 1$, $\lambda 2 \ldots \lambda n$ (see Fig. 10), Inada also discloses in col. 11, lines 57-67, each dispersion compensation element 7 having a different delay characteristic, see Figure 10, so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength.

Regarding claims 28 and 32, Inada discloses an optical coupler 2 for coupling the incoming optical signal from a first optical fiber 1 to the multiplexer/demultiplexer 3 of figure 10 (equivalent to a demultiplexer) and for coupling the outgoing optical signal from the a multiplexer/demultiplexer 3 of figure 10 (equivalent to a multiplexer) into a second optical fiber.

Regarding claim 29, Inada further discloses the optical coupler 2 is an optical circulator (figure 10).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3-6, 8, 14-16, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inada et al. (hereinafter Inada) US Patent no. 6,920,261 in view of Kashihara et al. US Patent no. 6,567,587.

Regarding claims 3 and 14, Inada does not specifically disclose the dispersion compensation is a bragg grating. Kashihara discloses the dispersion compensation element 7b is a Bragg grating (col. 3, lines 29, 37).

It would have been obvious to an artisan at the time of the invention was made to implement the teaching of Kashihara in the apparatus of Inada that is include the Bragg grating dispersion compensation taught by Kashihara in the dispersion compensation 7 of Inada . One of ordinary skill in the art would have been motivated to do this in order to reduce the wavelength dispersion per each wavelength. Thus, it improves cross-talk performance between the wavelengths of the WDM system.

Regarding claim 4, Kashihara discloses in col. 5, lines 3-4, the using of a fiber Bragg grating for dispersion compensation.

Regarding claim 5, Kashihara discloses in col. 4, lines 65-66, the dispersion compensation elements 7b is a waveguide Bragg grating.

Regarding claim 6, Kashihara discloses a multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer and the demultiplexer) are a surface diffraction grating (col. 2, lines 63-65).

Regarding claims 8, 16 and 23, Kashihara discloses multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer and the demultiplexer) are an array waveguide (col. 4, lines 19-21) and the dispersion compensation elements are waveguide Bragg gratings (col. 4, lines 65-66) and the array waveguide and the waveguide Bragg gratings are combined on a single optical substrate 2 of figure 1.

Regarding claims 15 and 22, Kashihara discloses multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer and the demultiplexer) are an array waveguide (AWG) (col. 4, lines 19-21) and the dispersion compensation elements 7b is a waveguide Bragg grating (col. 4, lines 65-66).

5. Claims 9, 17, 24, 30 and 33-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inada et al. (hereinafter Inada) US Patent no. 6,920,261 in view of Richardson et al. US Patent no. 6,628,864.

Regarding claims 9, 17, 24, 30 and 33-35, as per claims above, Inada discloses all the limitations except for the optical network is an optical code division multiple access (OCDMA) network. Richardson discloses the OCDMA optical network (figure 7) having OCDMA coder 275 and 260 (col. 11, lines 59-60), which generate the OCDMA code for modulating with an optical signal then transmit the OCDMA coded signal to the transmission link 300 (col. 11, lines 61-67). Since CDMA or CDMA for optical

telecommunication (i.e. OCDMA) is well recognized in the art for spreading spectrum technique that permits a large number of separate users to share the same extended transmission bandwidth but to be individually addressable through the allocation of specific address codes (col. 1, lines 24-28 of Richardson), it would have been obvious to an artisan at the time of the invention was made to implement the teaching of Richardson that is encoding the OCDMA in the high speed and large capacity optical communication system of Inada. One of ordinary skill in the art would have been motivated to do this in order to improve cross-talk performance, asynchronous access and potential for improved system security (col. 1, lines 48-51 of Richardson).

Regarding claim 36, Inada discloses in figure 10, the dispersion compensation element 7 connected to the plurality of output waveguides 4 for dispersion compensation each wavelengths $\lambda 1$, $\lambda 2 \ldots \lambda n$.

6. Claims 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inada et al. (hereinafter Inada) US Patent no. 6,920,261 in view of Richardson et al. US Patent no. 6,628,864 and further in view of Kashihara et al. US Patent no. 6,567,587.

Regarding claim 37, Inada and Richardson do not specifically disclose the dispersion compensation is a bragg grating. Kashihara discloses the dispersion compensation element 7b is a Bragg grating (col. 3, lines 29, 37).

It would have been obvious to an artisan at the time of the invention was made to implement the teaching of Kashihara in the apparatus of Inada that is include the Bragg grating dispersion compensation taught by Kashihara in the dispersion compensation 7

of Inada and Richardson. One of ordinary skill in the art would have been motivated to do this in order to reduce the wavelength dispersion per each wavelength. Thus, it improves cross-talk performance between the wavelengths of the WDM system.

Regarding claim 38, Kashihara discloses a multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to a multiplexer) serving as both the multiplexer means and the demultiplexer means.

Regarding claim 39, Kashihara discloses multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer) and the Bragg gratings are combined on a single optical substrate (figure 1, element 2).

7. Claims 10, 18 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inada et al. (hereinafter Inada) US Patent no. 6,920,261 in view of Miyauchi et al. US Patent no. 6,570,691.

Regarding claims 10, 18 and 25, as per claims above, Inada discloses all the limitations except for the dispersion compensation element is located at an endpoint of the optical communication network. Miyauchi discloses an optical transmission system having a dispersion compensation element 14 located at the receiver 7. It would have been obvious to an artisan at the time of the invention was made to implement the teaching of Miyauchi that is impose the dispersion compensation element at the receiver side of the optical communication system of Inada. One of ordinary skill in the art would have been motivated to do this since the advantage of using the dispersion compensation element (or Bragg grating) is that the amount of reflectivity of the grating

can be chosen so as to provide a desired output coupling, which can be used to optimize output power, efficiency and improve cross-talk performance at the receiving end.

Response to Arguments

8. Applicant's arguments with respect to claims 1-39 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dzung D Tran whose telephone number is (571) 272-3025. The examiner can normally be reached on 9:00 AM - 7:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye, can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dzung Tran

Dzung Tran
01/17/2006